

# **PUMP WITH GAUGE**

## **Cross-Reference**

The present application is a continuation-in-part application of US Patent No. 10/189441.

## **Field of Invention**

The present invention relates to a pump equipped with a gauge.

## **Background of Invention**

Taiwanese Patent Publication No. 446070 teaches an upright pump including internal and external cylinders. This conventional pump includes a base 10, an internal cylinder 24 mounted on the base 10, a piston 43 movably inserted in the internal cylinder 24, a rod 41 connected with the piston 43, an external cylinder 50 mounted on the internal cylinder 24, a gauge set 70 mounted on the external cylinder 50 and a nozzle 90 in communication with the gauge set 70 through a pipe 80. The internal cylinder 24 defines a space 22 and an aperture 25 at a lower end in communication with the space 22. A space 52 is confined between the internal cylinder 24 and the external cylinder 50. The space 22 is in communication with the space 52 through the aperture 25. The external cylinder 50 defines an aperture 53 near an upper end. The gauge set 70 is located at the upper end of the external cylinder 50. A space defined in the gauge set 70 is in communication with the space 52 through the aperture 53. In pumping, pressurized air flows from the

1 space 22 to the space 52 from which the pressurized air flows to the space  
2 defined in the gauge set 70 through the aperture 53. This conventional  
3 pump is complicated in structure and causes trouble for a worker to  
4 assemble and therefore entails a high cost for fabrication. The  
5 pressurized air travels for a distance twice as much as the length of the  
6 internal cylinder 24, thus reducing efficiency for pumping.

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8 The present invention is therefore intended to obviate or at least alleviate  
9 the problems encountered in prior art.

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#### 11 **Summary of Invention**

12 It is the primary objective of the present invention to provide a simple  
13 pump equipped with a gauge that can easily be observed.

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15 According to the present invention, a pump includes a base, a pumping  
16 set, a first joint, a gauge set, a second joint and a nozzle. The base  
17 includes a socket. The gauge set includes a gauge, a housing for  
18 receiving the gauge and a tube extending from the housing. The  
19 pumping set includes a cylinder inserted in the socket and a piston put in  
20 the cylinder. The first joint is put in the cylinder and includes a  
21 transverse channel and an axial channel communicated with the  
22 transverse channel. The second joint is inserted in the socket, the  
23 cylinder, the transverse channel of the first joint and the tube. The  
24 second joint includes an axial channel, a first transverse channel for  
25 communicating the axial channel hereof with the axial channel of the first

1 joint and a second transverse channel for communicating the axial  
2 channel thereof with the tube. The nozzle is communicated with the  
3 second joint.

4  
5 Other objects, advantages and novel features of the invention will become  
6 more apparent from the detailed description when taken in conjunction  
7 with the drawings.

### 8 9 **Brief Description of Drawings**

10 The present invention will be described through detailed illustration of  
11 embodiments referring to the drawings.

12  
13 Figure 1 is a perspective view of a pump according to a first embodiment  
14 of the present invention.

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16 Figure 2 is an exploded view of the pump of Figure 1.

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18 Figure 3 is a cross-sectional view of the pump of Figure 1.

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20 Figure 4 is a cross-sectional view of a pump according to a second  
21 embodiment of the present invention.

### 22 23 **Detailed Description of Embodiments**

24 Referring to Figures 1-3, a pump 60 according to a first embodiment of  
25 the present invention includes a base 10, a pumping set 20 in

1 communication with the base 10, a gauge set 70 in communication with  
2 the base 10 and a nozzle set 50 in communication with the gauge set 70.

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4 The base 10 includes a socket 12 and two pedals 14 extending from the  
5 socket 12. The socket 12 defines two apertures 16.

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7 The pumping set 20 includes a cylinder 24, a piston 22 put in the cylinder  
8 24, a rod 21 connected with the piston 22 and a handle 25 attached to the  
9 rod 21. The cylinder 24 defines two apertures 23 near a lower end  
10 thereof. The cylinder 24, the piston 22 and the rod 21 will not be  
11 described in detail for being conventional.

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13 A first joint 30 defines a transverse channel 32 and an axial channel 33 in  
14 communication with the transverse channel 32. An annular seal 31 is  
15 mounted on the first joint 30.

16

17 The gauge set 70 includes a gauge 72, a housing 74 for receiving the  
18 gauge 72, a tube 76 extending from the housing 74 and a collar 78 formed  
19 on the tube 76. The tube 76 defines two apertures 79.

20

21 A second joint 40 includes an axial channel 41 defined therein, a first  
22 transverse channel 42 in communication with the axial channel 41 and a  
23 second transverse channel 43 in communication with the axial channel 41.  
24 A check valve 48 is installed in the axial channel 41 in order to allow air  
25 to flow from the first transverse channel 42 to the second transverse

1 channel 43 only, not vice versa. Two annular seals 44 are mounted on  
2 the second joint 40. The first transverse channel 42 is positioned  
3 between the annular seals 44. Two annular seals 45 are mounted on the  
4 second joint 40. The second transverse channel 43 is positioned  
5 between the annular seals 45. The second joint 40 includes a head 46 at  
6 one end and a thread 47 at an opposite end.

7

8 The nozzle set 50 includes a cap 51, a nozzle 51 and a pipe 53 via which  
9 the cap 51 is communication with the nozzle 52.

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11 In assembly, the first joint 30 is put in the lower end of the cylinder 24 so  
12 that the transverse channel 32 is in communication with the apertures 23.  
13 The annular seal 31 provides sealing between the first joint 30 and the  
14 cylinder 24. The collar 78 is put on the socket 12 so that the apertures  
15 79 are in communication with the apertures 16. Through the collar 78,  
16 the lower end of the cylinder 24 is inserted in the socket 12 so that the  
17 apertures 23 are in communication with the apertures 16. Thus, the  
18 transverse channel 32, the apertures 23, 16 and 79 are in communication  
19 with one another.

20

21 The second joint 40 is inserted in the apertures 16 and 23 and the  
22 transverse channel 32 and the apertures 79. The axial channel 33 of the  
23 first joint 30 is in communication with the first transverse channel 42 of  
24 the second joint 40. The annular seals 44 ensure that air flows from the  
25 axial channel 33 of the first joint 30 to the first transverse channel 42 of

1 the second joint 40. The second transverse channel 43 of the second  
2 joint 40 is in communication with the tube 76. The annular seals 45  
3 ensure that air flows from the second transverse channel 43 of the second  
4 joint 40 to the tube 76. The air flows to the gauge 72 through the tube  
5 76 and the housing 74.

6

7 The thread of the hollow connector 52 is engaged with the thread 47 of  
8 the second joint 40. The axial channel 41 is in communication with the  
9 cap 51. The nozzle 52 can be engaged with a valve of an article to be  
10 pumped.

11

12 Figure 4 shows a pump 60' according to a second embodiment of the  
13 present invention. The pump 60' is identical to the pump 60 except that  
14 first joint 30 is integrated with the base 10. The socket 12 can be saved  
15 in the pump 60'.

16

17 The present invention has been described via detailed illustration of two  
18 embodiments. Those skilled in the art can derive variations from the  
19 embodiments without departing from the scope of the present invention.  
20 Hence, the embodiments shall not limit the scope of the present invention.  
21 The scope of the present invention is defined in the claims.

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